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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/811,237	03/26/2004	Anand P. Singh	03108/0201083-US0	9027

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DARBY & DARBY P.C.
P. O. BOX 5257
NEW YORK, NY 10150-5257

EXAMINER

WITHERSPOON, SIKARL A

ART UNIT PAPER NUMBER

1621

DATE MAILED: 06/08/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/811,237

Applicant(s)

SINGH ET AL.

Examiner

Sikarl A. Witherspoon

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 12 October 2004.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-7 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-7 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date 10/12/04.
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____.

DETAILED ACTION

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 1-7 are rejected under 35 U.S.C. 103(a) as being unpatentable over Chidambaram et al (J. of Catalysis, 2003.) and further in view of Desmurs et al (US 6,348,631).

The instant claims are drawn to a process for preparing 4,4'-dimethylbenzophenone by acylating toluene with an acylating agent in the presence of a solid acid triflic acid functionalized mesoporous zirconia catalyst. Further limitations include the acylating agent being a halide of a benzoic acid, specifically, para-toluoyl chloride.

Chidambaram et al teach triflic acid-functionalized mesoporous zirconium catalysts that are useful for the benzoylation of biphenyl with benzoyl chloride at a temperature of 100 to 150° C (abstract and scheme 3 on p 445). The triflic acid-functionalized mesoporous zirconium catalyst comprises cetyltrimethylammonium bromide, tetramethylammonium hydroxide, zirconium tetrahydroxide, dry toluene, and triflic acid, and a pore size of 0.25 to 0.31 Angstrom, and a surface area of 371 m²/g (scheme 1 on p 444, and table 1 on p 447).

The differences between Chidambaram et al and the instant process are that Chidambaram et al teach a different starting material, hence, and different product, and a different acylating agent, as claimed herein.

However, Desmurs et al teach a method for acylation of an aromatic compound using a catalyst, such as triflic acid, that may be supported on an oxide of aluminum, silicon and/or zirconium. Starting compounds include benzene, toluene, and the like, or condensed polycyclic compounds, such as naphthalene, or non-condensed compounds such as cyclohexylbenzene (col. 3, lines 25-59). Various acylating agents, including acetyl chloride, benzoyl chloride, crotonyl chloride, etc., may be employed (col. 8, lines 18-56).

Therefore, in view of the combined reference teachings, the examiner purports that it would have been obvious to a person of ordinary skill in the art to substitute the biphenyl starting material illustrated in the process taught by Chidambaram et al with a different aromatic compound, such as benzene or toluene, as suggested by Desmurs et al, and to employ a different acylating agent than the benzoyl chloride employed by Chidambaram et al. One of ordinary skill would have been motivated to so modify Chidambaram et al by the desire to acylate different types of aromatic compounds, using a triflic acid-functionalized mesoporous zirconium catalyst, that has been shown to exhibit enhanced catalytic activity in acylation reactions. It would also have been obvious to a person of ordinary skill in the art to select an acylating agent, based on the starting aromatic compound, that would afford the desired acylated product; a person of ordinary skill would also employ a ratio of acylating agent to starting compound that

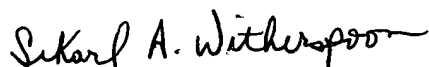
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would afford optimal conversion of the aromatic compound to the acylated aromatic compound.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Sikarl A. Witherspoon whose telephone number is 571-272-0649. The examiner can normally be reached on M-F 8:30-6:30.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Johann Richter can be reached on 571-272-0646. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system: Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).



Sikarl A. Witherspoon
Patent Examiner
Technology Center 1600